



Contribution ID: 246 Contribution code: AOG-6

Type: Oral Presentation

Distribution and sources of anthropogenic ^{233}U , ^{236}U in the South China Sea

Friday, 25 October 2024 13:50 (20 minutes)

Uranium-233 (^{233}U) and uranium-236 (^{236}U) in the environment mainly originate from human nuclear activities. Based on the long half-lives and high solubility of uranium, ^{236}U and ^{233}U can be used as powerful tracers for the investigation of oceanographic and environmental processes. However, insufficient work limits the understanding of the source items of anthropogenic ^{233}U , ^{236}U in the South China Sea (SCS) and the assessment of their environmental process, which are of great importance to the identification of potential radioactive pollutant sources. This study, for the first time, reported the ^{236}U and ^{233}U levels of 64 surface seawaters collected in the SCS from August to September 2018. The measured $^{236}\text{U}/^{238}\text{U}$ and $^{233}\text{U}/^{238}\text{U}$ atomic ratios are $(0.99\text{--}1.15)\text{E}\text{--}9$ and $(1.1\text{--}49.5)\text{E}\text{--}12$, which are respectively higher than their natural backgrounds of $\text{E}\text{--}14\text{--}\text{E}\text{--}10$ and $\text{E}\text{--}14\text{--}\text{E}\text{--}11$, indicating that the SCS were obviously affected by the human nuclear activities. In comparison to the reprocessing-plant-affected $^{236}\text{U}/^{238}\text{U}$ in the Baltic Sea $(1.42\text{--}22.5)\text{E}\text{--}9$, the input of anthropogenic ^{236}U to the SCS is mainly from the contribution of the global fallout. Furthermore, by performing the $^{129}\text{I}/^{236}\text{U}\text{--}^{236}\text{U}/^{238}\text{U}$ mixing model, our data demonstrated that the global fallout was the major contributor to the ^{236}U in the SCS at the moment of sampling. This study aims to open up an avenue for the study of uranium-isotope tracing and add essential information for future assessments of environmental radioactivity in the SCS.

Student Submission

No

Primary author: WANG, Yanyun (Institute of Earth Environment, Chinese Academy of Sciences)

Co-authors: CHRISTL, Marcus (ETH Zurich); HOU, Xiaolin (Institute of Earth Environment, Chinese Academy of Sciences)

Presenter: WANG, Yanyun (Institute of Earth Environment, Chinese Academy of Sciences)

Session Classification: Applications in Oceanography

Track Classification: Applications in Oceanography